

Claims

What is claimed is:

1. A subscriber unit for connection with a public  
5 switched telephone network having at least one switch and at  
least one digital subscriber line in communication with the  
switch, the digital subscriber line capable of sending and  
receiving a plurality of data packets, the subscriber unit  
operable to send and receive voice calls over the public  
10 switched telephone network, the subscriber unit comprising:  
a digital subscriber line interface unit, in  
communication with the digital subscriber line, for receiving  
the plurality of data packets from the digital subscriber  
line, for identifying selected ones of the plurality of  
15 received data packets corresponding to a received data stream  
of a first derived digital telephone line, and for  
transmitting, on the digital subscriber line, a plurality of  
transmitted data packets corresponding to a transmitted data  
stream of the first derived digital telephone line;  
20 a coder/decoder, in communication with the digital  
subscriber line interface unit, for receiving the transmitted  
data stream, for coding the transmitted data stream into the  
plurality of transmitted data packets, for receiving the  
plurality of received data packets and for decoding the  
25 plurality of received data packets into the received data  
stream;  
an analog-to-digital converter, in communication with the  
coder/decoder, for converting a transmitted analog signal into  
the transmitted data stream;  
30 a digital-to-analog converter, in communication with the  
coder/decoder, for converting the received data stream into a  
received analog signal; and

an user interface unit, in communication with the analog-to-digital converter and the digital-to-analog converter, for providing an interface to a user of the subscriber unit, and for generating the transmitted analog signal and for  
5 generating an acoustic signal based on at least a portion of the received analog signal.

2. The subscriber unit of claim 1 wherein the user interface unit further comprises a telephone keypad and a DTMF  
10 tone generator.

3. The subscriber unit of claim 1 wherein the user interface unit further comprises a telephone handset and a switch hook.  
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4. The subscriber unit of claim 1 wherein the user interface unit further comprises a telephone line interface unit.

5. The subscriber unit of claim 1 wherein the user interface unit further comprises an alert signal generator.  
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6. The subscriber unit of claim 1 wherein the user interface unit further comprises a processor.  
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7. The subscriber unit of claim 6 wherein the user interface unit further comprises a display unit in communication with the processor.

8. The subscriber unit of claim 7 wherein the display unit is capable of displaying a plurality of data relating to an outgoing call.  
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9. The subscriber unit of claim 7 wherein the processor is capable of receiving and decoding caller identification data relating to the identity of an incoming caller and the display unit is capable of displaying a plurality of data  
5 relating an incoming call.

10. The subscriber unit of claim 9 wherein the user interface unit further comprises a call memory, in communication with the processor, for storing the plurality of  
10 data relating to an incoming call for a plurality of incoming calls.

11. The subscriber unit of claim 9 wherein the plurality of data relating the incoming call includes data indicating if  
15 the incoming call includes a facsimile message.

12. The subscriber unit of claim 7 wherein the display unit is capable of displaying a plurality of call control  
options.  
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13. The subscriber unit of claim 12 wherein the user interface unit further comprises a plurality of additional keys adjacent to the display unit, the plurality of keys operable by the user to activate selected ones of the call  
25 control options displayed adjacent thereto.

14. The subscriber unit of claim 8 wherein the user interface unit further comprises a call memory for storing the plurality of data relating to an outgoing call for a plurality  
30 of outgoing calls.

15. The subscriber unit of claim 14 wherein the plurality of data relating the outgoing call includes a duration of the call for at least one of the plurality of outgoing calls.

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16. The subscriber unit of claim 15 wherein the plurality of data relating the outgoing call includes a destination telephone number of the call for at least one of the plurality of outgoing calls.

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17. The subscriber unit of claim 16 wherein the user interface unit further comprises a data interface unit for downloading a plurality of stored data to an external device.

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18. The subscriber unit of claim 6 wherein the user interface unit further comprises a smart card interface unit capable of accepting and communicating with a smart card.

19. The subscriber unit of claim 18 wherein the processor is capable of downloading a plurality of smart card data from a smart card inserted in the smart card interface unit, the plurality of smart card data including data associated with the user.

20. The subscriber unit of claim 7 wherein the processor is coupled to the coder/decoder and wherein digital subscriber line interface and coder/decoder are capable of accepting data corresponding to a second derived digital telephone line and wherein the processor is capable of monitoring the status of the second derived digital telephone line.

21. The subscriber unit of claim 20 wherein the subscriber unit, in response to a signal generated by the user interface unit in response to an action of the user, is capable of initiating the second derived digital telephone  
5 line.

22. The subscriber unit of claim 21 wherein the subscriber unit, in response to a signal generated by the user interface unit in response to an action of the user, is  
10 capable of initiating up to N additional derived digital telephone lines, where N is greater than 2.

23. The subscriber unit of claim 7 wherein the processor is coupled to the coder/decoder, wherein the user interface  
15 unit further comprises a keyboard and wherein the subscriber unit is capable of communication with a first data service over the digital subscriber loop.

24. The subscriber unit of claim 23 wherein the  
20 communication with the first data service over the digital subscriber loop uses data packets that do not correspond to the first derived digital telephone line.

25. The subscriber unit of claim 23 wherein the user interface unit further comprises a display driver for driving a remote display device.

26. The subscriber unit of claim 1 wherein the digital subscriber line is an asymmetric digital subscriber line.

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27. A telecommunication system comprising:  
a digital switch;

a local loop coupling the digital switch to a subscriber location, a segment of the local loop including copper twisted  
5 pair;

an asymmetrical digital subscriber line carried by the local loop, the asymmetrical digital subscriber line comprising a plurality of derived digital telephone lines; and

a subscriber unit, coupled to the asymmetrical digital  
10 subscriber line, for accessing and monitoring the plurality of derived digital telephone lines and for conducting a voice call over at least one of the derived digital telephone lines.

28. The system of claim 27 wherein the plurality of  
15 derived digital telephone lines includes a first derived digital telephone line and a second derived digital telephone line and wherein the subscriber unit is operable to initiate the second derived digital telephone line for connection to the digital switch when the first derived digital telephone  
20 line is simultaneously communicating with the digital switch.

29. The telecommunication system of claim 27 wherein the subscriber unit further comprises a processor and a display unit in communication with the processor.  
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30. The telecommunication system of claim 29 wherein the display unit is capable of displaying a plurality of data relating to an outgoing call.

31. The telecommunication system of claim 27 wherein the processor is capable of receiving and decoding caller identification data relating to the identity of an incoming caller and the display unit is capable of displaying a plurality of data relating an incoming call.

32. The telecommunication system of claim 31 wherein the subscriber unit further comprises a call memory, in communication with the processor, for storing the plurality of data relating to an incoming call for a plurality of incoming calls.

33. The telecommunication system of claim 31 wherein the plurality of data relating the incoming call includes data indicating if the incoming call includes a facsimile message.

34. The telecommunication system of claim 29 wherein the display unit is capable of displaying a plurality of call control options.

35. The telecommunication system of claim 34 wherein the subscriber unit further comprises a plurality of additional keys adjacent to the display unit, the plurality of keys operable by the user to activate selected ones of the call control options displayed adjacent thereto.

36. The telecommunication system of claim 29 wherein the subscriber unit further comprises a call memory for storing the plurality of data relating to an outgoing call for a plurality of outgoing calls.

37. The telecommunication system of claim 36 wherein the plurality of data relating the outgoing call includes a duration of the call for at least one of the plurality of outgoing calls.

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38. The telecommunication system of claim 37 wherein the plurality of data relating the outgoing call includes a destination telephone number of the call for at least one of the plurality of outgoing calls.

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39. The telecommunication system of claim 38 wherein the subscriber unit further comprises a data interface unit for downloading a plurality of stored data to an external device.

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40. The telecommunication system of claim 29 wherein the subscriber unit further comprises a smart card interface unit capable of accepting and communicating with a smart card.

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41. The telecommunication system of claim 40 wherein the processor is capable of downloading a plurality of smart card data from a smart card inserted in the telephone, the smart card data including data associated with the user.

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42. The telecommunication system of claim 29 wherein the subscriber unit further comprises a keyboard and wherein the telecommunication system is capable of communication with a first data service over the asymmetrical digital subscriber line.



43. The telecommunication system of claim 42 wherein the communication with the first data service over the asymmetrical digital subscriber line uses data packets that do not correspond to the plurality of derived digital telephone  
5 lines.

44. The telecommunication system of claim 43 wherein the subscriber unit further comprises a display driver for driving a remote display device.  
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45. The telecommunication system of claim 27 wherein the subscriber unit includes a visual indicator device for indicating if the first derived digital line is in use.

46. The telecommunication system of claim 27 wherein the asymmetrical digital subscriber line further includes at least one data channel for carrying data signals not related to the plurality of derived digital telephone lines.  
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47. The system of claim 27 wherein the plurality of derived digital telephone lines wherein the subscriber unit is operable to initiate a first of the plurality of derived digital telephone lines for connection to the digital switch when the first derived digital telephone line is  
20 simultaneously communicating with the digital switch.  
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48. A subscriber interface unit for use in a telecommunication system including a digital switch, a local loop coupling the digital switch to a subscriber location, wherein a segment of the local loop includes copper twisted pair and wherein an asymmetrical digital subscriber line is carried by the local loop, the asymmetrical digital subscriber line a plurality of derived digital telephone lines, the subscriber interface unit for coupling the asymmetrical digital subscriber line to an analog land-line telephone, the subscriber interface unit comprising:

a housing having a top surface and a bottom surface substantially coplanar to the top surface;

an electrical coupler, coupled to the housing for connection to a cable carrying the asymmetrical digital subscriber line;

an RJ-11 jack, coupled to the housing, for connection to a cable of the analog telephone; and

a converter, coupled to the electrical coupler and to the RJ-11 jack, for converting the first analog signals generated by the analog telephone into a first plurality of data packets for transmission to a selected one of the plurality of derived digital telephone lines and for converting a second plurality of data packets received from the selected one of the plurality of derived digital telephone lines into a second analog signal for transmission to the analog telephone.

49. The subscriber interface unit of claim 48 wherein the top surface of the housing includes a first indented portion for accepting the analog telephone on top thereof.

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50. The subscriber unit of claim 49 wherein the housing has a height and a width and wherein the width of the housing is greater than the height.

51. The subscriber unit of claim 49 further comprising a plurality of non-skid feet coupled to the bottom surface of the housing.

5        52. The subscriber interface unit of claim 49 wherein  
the analog telephone is capable of accessing and monitoring  
the plurality of telephone lines is further capable of  
selecting one of the plurality of telephone lines for  
conducting a voice call and wherein the converter further is  
10 capable of converting a third plurality of data packets  
received from an additional one of the plurality of derived  
digital telephone lines into third analog signal for  
transmission to the analog telephone.

15        53. The telecommunication system of claim 48 wherein the  
asymmetrical digital subscriber line further includes at least  
one data channel for carrying data signals not related to the  
plurality of derived digital telephone lines.

54. A method for use in a telecommunication system including a digital switch, a local loop coupling the digital switch to a subscriber location, wherein a segment of the local loop includes copper twisted pair and wherein an asymmetrical digital subscriber line is carried by the local loop, the asymmetrical digital subscriber line including a plurality of data packets capable of carrying a plurality of derived digital telephone lines, the telecommunication system further comprising a subscriber unit coupled to the asymmetrical digital subscriber line, the method comprising the steps of:

monitoring, at the subscriber unit, the content of at least one of the plurality of data packets;

determining, at the subscriber unit, that a first derived digital telephone line is in use based on the content of the at least one of the plurality of data packets; and

generating a line-in-use signal, at the subscriber unit, indicating a first derived digital telephone line is in use.

55. The method of claim 54 further comprising the step of:

generating a visual indicator, at the subscriber unit, in response to the line-in-use signal.

56. The method of claim 54 further comprising the steps of:

receiving an add-a-line signal, generated by the subscriber unit in response to an action of a user; and

initiating a second derived digital telephone line in response to the add-a-line signal.

57. The method of claim 56 further comprising the steps of:

receiving a hold signal, generated by the subscriber unit in response to an action of a user; and

5 placing the second derived digital telephone line on hold in response to the hold signal.

58. The method of claim 57 further comprising the steps of:

10 receiving a line signal, generated by the subscriber unit in response to an action of the user, the line signal indicating a corresponding derived digital telephone line of the group comprising: the first derived digital telephone line, and the second derived digital telephone line; and

15 accessing, at the subscriber unit, the corresponding derived digital telephone line.

59. The telecommunication system of claim 54 wherein the asymmetrical digital subscriber line further includes at least  
20 one data channel for carrying data signals not related to the plurality of derived digital telephone lines.

60. A method for use in a telecommunication system including a digital switch, a local loop coupling the digital switch to a subscriber location, wherein a segment of the local loop includes copper twisted pair and wherein an asymmetrical digital subscriber line is carried by the local loop, the asymmetrical digital subscriber line including a plurality of data packets capable of carrying a plurality of derived digital telephone lines, the telecommunication system further comprising a subscriber unit coupled to the asymmetrical digital subscriber line, the method comprising the steps of:

receiving an off-hook signal, generated by the subscriber unit in response to an action of a user; and initiating a first derived digital telephone line of the plurality of derived digital telephone lines in response to the off-hook signal.

61. The method of claim 60 further comprising the steps of:

generating a line-in-use signal, at the subscriber unit, indicating a first derived digital telephone line is in use.

62. The method of claim 61 further comprising the step of:

generating a visual indicator, at the subscriber unit, in response to the line-in-use signal.

63. The method of claim 60 further comprising the step of:

monitoring, at the subscriber unit, the content of at least one of the plurality of data packets.

64. The method of claim 60 further comprising the steps  
of:

receiving an on-hook signal, generated by the subscriber unit in response to an action of a user; and

5           terminating the first derived digital telephone line of  
the plurality of derived digital telephone lines in response  
to the on-hook signal.